

REMARKS

Claims 1, 2, 6, 8-12, 15-23 and 25-29 are now pending in the application. Claims 1, 2, 6, 8-12, 15-23 and 25-29 stand rejected. Claims 3-5, 7, 13, 14, 24 and 30-31 have been previously cancelled, and Claims 32-35 are new. Support for the new claims can be found throughout the application, drawings and claims as originally filed and, as such, no new matter has been presented. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

SPECIFICATION

The specification has been amended to correct minor informalities. Applicant respectfully submits that no new matter has been added via these minor amendments. Accordingly, acceptance of these specification amendments are respectfully requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 12, 15, 16, 19-23, 26 and 27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Goldberg (U.S. Pat. No. 3,392,918; hereinafter "Goldberg") singly or in view of Schulze et al. (U.S. Pat. No. 3,266,244; hereinafter "Schulze"). These rejections are respectfully traversed.

Initially, Applicant notes that Goldberg appears to disclose a jet motor 10 having hydraulic actuating cylinders 18 with an actuating rod 19 and a connector 20. One end of the cylinder 18 is coupled to the flying vehicle structure 17, while the connector 20 is coupled either the throat 14 or exit cone 23 of the motor 10. The hydraulic actuating

cylinders 18 extend the rods 19 to enable the throat 14 or exit cone 23 to move laterally with respect to the flying vehicle structure 17. Schulze appears to disclose the use of a double acting hydraulic cylinder 36 connected to a linkage system (arm 42, shaft, 44, arm 46, rod 48) to deflect the nozzle tip 62. In contrast, independent Claim 12 recites:

at least one **gimbal ring** pivotably coupled to supporting structure and to the flange portion of the nozzle rim to allow pivoting of the nozzle rim relative to the gimbal ring about a first axis and pivoting of the nozzle rim relative to the supporting structure about a second axis for changing a vector at which the exhaust flow is discharged from the nozzle rim...(emphasis added).

Further, independent Claim 21 recites:

receiving the exhaust flow in a bendable duct that is received within a nozzle rim for delivery of exhaust to a nozzle rim having a flange portion pivotably coupled to supporting structure with a **two-axis gimbal joint**;...(emphasis added).

Independent Claim 26 recites:

pivotably coupling a flange portion of a nozzle rim to supporting structure adjacent said jet engine, **with a two-axis gimbal joint**;...(emphasis added).

In view of the above discussion, Applicant submits that neither Goldberg nor Schulze, either alone or in combination, teach or suggest each and every element of Applicant's Claims 12, 21 and 26. In this regard, neither Goldberg nor Schulze, nor the combined disclosure of these references, teach, suggest or disclose a gimbal ring pivotably coupled to a support structure and to a flange portion of a nozzle rim to allow pivoting of the nozzle rim. The Office states that the flying vehicle structure 17 is a gimbal ring. Applicant respectfully asserts the Office is mistaken in this interpretation.

In particular, a gimbal is commonly known as a mechanical device that enables an object to pivot in one or more directions, and a typical gimbal includes two or more pivots, with each pivot mounted on an axis such that the pivots are each at right angles with respect to each other. A fixed vehicle structure is not a gimbal.

Applicant further notes that neither Goldberg nor Schulze teach or suggest the use of a gimbal to pivot a nozzle. Rather, both Goldberg and Schulze disclose using hydraulic actuators coupled directly or indirectly to the nozzle, with the hydraulic actuators operable in an actuated position to extend laterally and deflect the nozzle. A gimbal, on the other hand, includes at least two or more pivots to enable an object to pivot in one or more directions, in contrast to a hydraulic actuator that extends linearly to deflect an object.

Accordingly, in view of the above discussion, as neither Goldberg nor Schulze teach, suggest or disclose each and every element in independent Claims 12, 21 and 26, Applicant submits the Office has not presented a *prima face* case of obviousness, and thus, Applicant respectfully requests the Examiner reconsider and withdraw the rejection of Claims 12, 21 and 26 under 35 U.S.C. § 103(a).

With regard to Claims 15, 16, 19, 20, 22 and 23, Applicant notes these claims depend either directly or indirectly from independent Claims 12, 21 or 26, and, thus, these claims should be in condition for allowance for the reasons set forth for Claims 12, 21 and 26 above. Therefore, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of Claims 15, 16, 19, 20, 22 and 23 under 35 U.S.C. §103(a).

With regard to Claim 27, Applicant notes that Claim 27 has independently allowable subject matter as none of the cited references teach, suggest or disclose pivotably coupling at least one gimbal ring to supporting structure or pivotably coupling the nozzle rim to the gimbal ring. Therefore, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of Claim 27 under 35 U.S.C. §103(a).

Claims 1, 2, 6, 8-12, 15-23, and 25-29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Goldberg singly or in view of Schulze et al. as applied above, and further in view of Voigt (U.S. Pat. No. 4,892,253; hereinafter "Voigt") and optionally Zeisloft (U.S. Pat. No. 3,090,198; hereinafter "Zeisloft"). These rejections are respectfully traversed.

Applicant respectfully refers the Office to the remarks regarding independent Claims 12, 21 and 26 for a discussion of the Goldberg and Schulze reference. With regard to the Voigt reference, Applicant notes that Voigt appears to disclose a steerable nozzle 14 that is mounted to a rocket motor 16 via a ball and socket joint 18. The ball and socket joint 18 enables the nozzle 14 to pivot. Zeisloft appears to disclose an exhaust nozzle 10 having a nozzle portion 14 pivotably connected to a stationary nozzle portion 12 by a gimbal 18. The nozzle portion 14 is steered via four externally coupled steering nozzles 22. The steering nozzles 22 are fed exhaust gases to move the nozzle portion 14. Both the nozzle portions 12, 14 are lined with insulation, such that the nozzle portions 12, 14 do not directly come into contact with exhaust gases. In contrast, independent Claim 1 recites:

a **gimbal ring** configured to pivot relative to the jet engine about a first axis;

* * *

a first actuator yoke plate that operatively engages the nozzle rim to cause the gimbal ring and nozzle rim to pivot relative to the jet engine about the first axis;

a second actuator yoke plate that operatively engages the nozzle rim to cause the nozzle rim to pivot relative to the gimbal ring about the second axis;

a bendable duct having an outlet end that is received in an internal shoulder within the nozzle rim, the bendable duct defining a conduit in which exhaust flow generated by the jet engine is received and **delivered directly** to the nozzle rim;...(emphasis added).

In view of the above discussion, Applicant respectfully asserts that the cited references, either alone or in combination, fail to teach, suggest or disclose Applicant's independent claims. In this regard, as discussed above, the combination of Goldberg and Schulze does not teach or suggest whatsoever a gimbal ring configured to pivot relative to the jet engine about a first axis, a gimbal ring pivotably coupled to a support structure and to a flange portion of a nozzle rim to allow pivoting of the nozzle rim, or a flange portion pivotably coupled to supporting structure with a two-axis gimbal joint, as claimed in the independent claims.

With regard to Voigt, Voigt does not remedy this shortcoming of Goldberg and Schulze, and further, it is improper to combine Voigt with Goldberg as this modification would render the Goldberg reference unsatisfactory for its intended purpose. Specifically, if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900,221 USPQ 1125 (Fed. Cir. 1984) MPEP 2143.01.

Goldberg states it is an object of his invention to “provide a jet propulsion motor wherein downstream portions of the motor nozzle...are actuated by **externally mounted** means...” (emphasis added; see at least Column 1, lines 32-36). As stated, the actuating means of the motor nozzle of Goldberg is coupled to the exterior of the vehicle structure. To modify Goldberg to include the linkages of Voigt would render the actuating means of Goldberg unsatisfactory for its intended purpose, as the yokes of Voigt are not mounted externally to the vehicle structure. Rather, the actuating means, or yokes, of Voigt are mounted to an interior surface of the missile skin structure 20. Thus, it is improper to modify Goldberg with Voigt as this modification would render the nozzle actuating means of Goldberg unsatisfactory for its intended purpose – providing an externally mounted actuating means.

Furthermore, modifying Goldberg with Voigt would also impermissibly change the principle of operation of the nozzle of Goldberg. In particular, if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (C.C.P.A. 1959) MPEP 2143.01.

The nozzle actuation means of Goldberg operates by hydraulically extending a rod to apply a distributed load via a connector directly to a surface of the nozzle. In contrast, the nozzle actuation means of Voigt is electromechanical and operates by rotating a gear set to apply a tangential point load via a yoke to an exterior surface of the nozzle. Thus, to modify Goldberg to include the nozzle actuation means, or yokes, of Voigt would impermissibly change the principle of operation of the nozzle actuation

means of Goldberg, in regard to both the force applied to actuate the nozzle and the method of application of the force (hydraulic versus electromechanical) and is improper.

With regard to the combination of Zeisloft with Goldberg and Schulze, Applicant respectfully asserts that Zeisloft does not remedy the shortcomings of the Goldberg reference. In this regard, Zeisloft teaches that the bellows are lined with a thick annular flexible coating of insulation to insulate the bellows from the exhaust gases. Thus, the bellows of Zeisloft do not deliver the exhaust flow directly to the nozzle rim, rather the channel formed by the insulation layer delivers the exhaust flow to the exhaust gas exit passage.

Accordingly, in view of the above discussion, Applicant respectfully asserts the Office has not presented a *prima facie* case of obviousness and as such, Applicant respectfully requests the Examiner to reconsider and withdraw the rejection of independent Claims 1, 12, 21 and 26 under 35 U.S.C. § 103(a).

With regard to Claims 2, 6, 8-11, 15-20, 22, 23, 25, and 27-29, Applicants note these claims depend directly or indirectly from either independent Claim 1, 12, 21 or 26, and, thus, should be in condition for allowance for the reasons set forth for Claims 1, 12, 21 and 26 above. Accordingly, Applicants respectfully requests the Examiner reconsider and withdraw the rejections of Claims 2, 6, 8-11, 15-20, 22, 23, 25, and 27-29 under 35 U.S.C. § 103(a).

NEW CLAIMS

Applicant has added new Claims 32-35 to further define Applicant's teachings. Support for these new claims can be found in Applicant's specification and drawings as

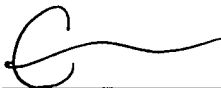
filed and, as such, these new claims do not constitute new matter. In addition, Applicant respectfully asserts new Claims 32-35 are in condition for allowance as none of the cited references teach, suggest or disclose a gimbal ring coupled on opposite sides to a ring support coupled to a support structure or a ring support that comprises an elongated member. Accordingly, Applicant respectfully submits Claims 32-35 are allowable.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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